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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/451,665	11/30/1999	SHUNPEI YAMAZAKI	07977/017002	9359

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EXAMINER	
SCHILLINGER, LAURA M	
ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 12/31/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Acti n Summary	Application No.	Applicant(s)
	09/451,665	YAMAZAKI ET AL.
	Examiner	Art Unit
	Laura M Schillinger	2813

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 22 October 2002.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1,2,4,5,7-13,15,16,18-23,25,26,28-34,36,37 and 39-86 is/are pending in the application.

4a) Of the above claim(s) 12,13,15,16,18-21,33,34,36,37,39-42,48-51,56-60 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1,2,4,5,7-11,22,23,25,26,28-32,43-47,52-55 and 61-86 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

This Office Action is in response to Amendment D filed 9/23/02, in Paper No.14.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-2, 4-5, 7-11, 22-23, 25-26, 28-32, 43-47, 52-55, 61-86 are rejected under 35 U.S.C. 102(e) as being anticipated by Zhang et al ('000).

In reference to claim 1, Zhang teaches a method comprising:

forming a crystalline semiconductor film on an insulating surface (Fig.1C (12 and 13));

forming an insulating film on the semiconductor film (Fig.2A (201) and Col.10, lines: 30-40);

introducing a dopant through the insulating film by an ion doping without mass separation (Col.10, lines: 50-68);

annealing the film (Col.11, lines: 1-15);

wherein the peak of a dopant profile is located in the insulating film (Zhang teaches that the silicon oxide layer is formed over the crystalline substrate prior to and during ion implantation Col.10, lines: 50-68. Since applicant's specification teaches that doing so produces peak

concentration within the SiO(x) layer, it is inferred that Zhang's same steps create the same results.)

In reference to claim 2, Zhang teaches wherein the insulating film is SiO (Col.10, lines: 30-40).

In reference to claim 4, Zhang teaches wherein the dopant is B (Col.10, lines: 51-68).

In reference to claim 5 Zhang teaches wherein the semiconductor film is polycrystalline Si (Col.1, lines: 30-38).

In reference to claim 7, Zhang teaches wherein B is supplied by diborane gas (Col.10, lines: 55-65).

In reference to claim 8, Zhang teaches wherein the insulating film is removed (Col.11, lines: 27-35- etching for contact holes).

In reference to claims 9 and 10, Zhang teaches a method comprising:

forming a crystalline semiconductor film on an insulating surface (Fig.1C (12 and 13));

forming an insulating film on the semiconductor film (Fig.2A (201) and Col.10, lines: 30-40);

introducing a dopant (Col.10, lines: 50-68);

annealing the film (Col.11, lines: 1-15);

wherein the peak of a dopant profile is located in the insulating film (Zhang teaches that the silicon oxide layer is formed over the crystalline substrate prior to and during ion implantation Col.10, lines: 50-68. Since applicant's specification teaches that doing so produces peak concentration within the SiO(x) layer, it is inferred that Zhang's same steps create the same results.)

In reference to claim 11, Zhang teaches further comprising laser irradiation (Col.11, lines: 1-15).

In reference to claims 22, Zhang teaches a method comprising:

forming a crystalline semiconductor film on an insulating surface (Fig.1C (12 and 13));

forming an insulating film on the semiconductor film (Fig.2A (201) and Col.10, lines: 30-40);

introducing a dopant into the crystalline film through the insulating film without mass separation (Col.10, lines: 50-68);

annealing the film (Col.11, lines: 1-15);

wherein the peak of a dopant profile is located above the insulating film (Zhang teaches that the silicon oxide layer is formed over the crystalline substrate prior to and during ion implantation Col.10, lines: 50-68 and further that a photoresist region is also formed to prevent the P region or N region from being doped with the opposite impurity. Since applicant's specification teaches that forming a photoresist over the oxide film produces peak concentration over the SiO(x) layer, it is inferred that Zhang's identical steps create the same results.)

In reference to claim 23, Zhang teaches wherein the insulating film is SiO (Col.10, lines: 30-40)..

In reference to claim 25, Zhang teaches wherein the dopant is B(Col.11, lines: 1-15).

In reference to claim 26 Zhang teaches wherein the semiconductor film is polycrystalline Si (Col.1, lines: 30-38).

In reference to claim 28, Zhang teaches wherein B is supplied by diborane gas (Col.10, lines: 51-68).

In reference to claim 29, Zhang teaches wherein the insulating film is removed (Col.11, lines: 27-35- etching for contact holes).

In reference to claims 30 and 31 Zhang teaches a method comprising:
forming a crystalline semiconductor film on an insulating surface (Fig.1C (12 and 13));
forming an insulating film on the semiconductor film (Fig.2A (201) and Col.10, lines: 30-40);
introducing a dopant (Col.10, lines: 50-68);
annealing the film (Col.11, lines: 1-15);
wherein the peak of a dopant profile is located above the insulating film (Zhang teaches that the silicon oxide layer is formed over the crystalline substrate prior to and during ion implantation

Col.10, lines: 50-68 and further that a photoresist region is also formed to prevent the P region or N region from being doped with the opposite impurity. Since applicant's specification teaches that forming a photoresist over the oxide film produces peak concentration over the SiO(x) layer, it is inferred that Zhang's identical steps create the same results.)

In reference to claim 32, Zhang teaches further comprising laser irradiation (Col.11, lines: 1-15).

In reference to claim 43, 44 and 45 Zhang teaches a method comprising:

forming a crystalline semiconductor film to become a channel on an insulating surface (Fig.1C (12 and 13));

forming an insulating film on the semiconductor film (Fig.2A (201) and Col.10, lines: 30-40);

introducing a dopant (Col.10, lines: 50-68);

annealing the film (Col.11, lines: 1-15);

wherein the peak of a dopant profile is located in the insulating film (Zhang teaches that the silicon oxide layer is formed over the crystalline substrate prior to and during ion implantation Col.10, lines: 50-68. Since applicant's specification teaches that doing so produces peak concentration within the SiO(x) layer, it is inferred that Zhang's same steps create the same results.)

In reference to claim 46, Zhang teaches wherein the concentration ranges from 5 x 10(15) to 5 x 10 (17) atoms/cm(3) (Col.11, lines: 1-15).

In reference to claim 47, Zhang teaches further comprising laser irradiation (Col.11, lines: 1-15).

In reference to claim 52, 53, and 54 Zhang teaches a method comprising:

forming a crystalline semiconductor film to become a channel on an insulating surface(Fig.1C (12 and 13));

forming an insulating film on the semiconductor film (Fig.2A (201) and Col.10, lines: 30-40);

introducing a dopant (Col.10, lines: 50-68);

annealing the film (Col.11, lines: 1-15);

wherein the peak of a dopant profile is located above the insulating film (Zhang teaches that the silicon oxide layer is formed over the crystalline substrate prior to and during ion implantation Col.10, lines: 50-68 and further that a photoresist region is also formed to prevent the P region or N region from being doped with the opposite impurity. Since applicant's specification teaches that forming a photoresist over the oxide film produces peak concentration over the SiO(x) layer, it is inferred that Zhang's identical steps create the same results.)

In reference to claim 55, Zhang teaches wherein the concentration ranges from 5 x10(15) to 5 x 10 (17) atoms/cm(3) (Col.11, lines: 1-15).

In reference to claim 56, Zhang teaches further comprising laser irradiation (Col.11, lines: 1-15).

In reference to claim 61, Zhang teaches wherein annealing is heating (Col.11, lines: 33-35).

In reference to claim 62, Zhang teaches wherein annealing is heating (Col.11, lines: 33-35).

In reference to claim 63, Zhang teaches wherein annealing is heating (Col.11, lines: 33-35).

In reference to claim 64, Zhang teaches wherein annealing is heating (Col.11, lines: 33-35).

In reference to claim 65, 71, 72 Zhang teaches a method comprising:

forming a crystalline semiconductor film to become a channel on an insulating surface (Fig.1C (12 and 13));

forming an insulating film on the semiconductor film (Fig.2A (201) and Col.10, lines: 30-40);

introducing a dopant through ion doping (Col.10, lines: 50-68);

removing the insulating film (Col.11, lines: 29-32- etching contact holes);

annealing the film Col.11, lines: 33-35);

wherein the peak of a dopant profile is located in the insulating film (Zhang teaches that the silicon oxide layer is formed over the crystalline substrate prior to and during ion implantation Col.10, lines: 50-68. Since applicant's specification teaches that doing so produces peak concentration within the SiO(x) layer, it is inferred that Zhang's same steps create the same results.)

In reference to claim 66, Zhang teaches wherein the insulating film is SiO (Col.10, lines: 30-40).

In reference to claim 67, Zhang teaches wherein the dopant is B(Col.10, lines: 51-68).

In reference to claim 68 Zhang teaches wherein the semiconductor film is polycrystalline Si (Col.1, lines: 30-38).

In reference to claim 69, Zhang teaches wherein B is supplied by diborane gas (Col.10, lines: 51-68).

In reference to claim 72, Zhang teaches further comprising laser irradiation (Col.11, lines: 1-15).

In reference to claim 73, Zhang teaches wherein annealing is heating (Col.11, lines: 33-35).

In reference to claim 74, 79, and 80 Zhang teaches a method comprising:

forming a crystalline semiconductor film to become a channel on an insulating surface (Fig.1C (12 and 13));

forming an insulating film on the semiconductor film (Fig.2A (201) and Col.10, lines: 30-40);

introducing a dopant through ion doping (Col.10, lines: 50-68);

removing the insulating film (Col.11, lines: 29-32- etching contact holes);

annealing the film Col.11, lines: 33-35);

wherein the peak of a dopant profile is located above the insulating film (Zhang teaches that the silicon oxide layer is formed over the crystalline substrate prior to and during ion implantation

Col.10, lines: 50-68 and further that a photoresist region is also formed to prevent the P region or N region from being doped with the opposite impurity. Since applicant's specification teaches that forming a photoresist over the oxide film produces peak concentration over the SiO(x) layer, it is inferred that Zhang's identical steps create the same results.)

In reference to claim 75, Zhang teaches wherein the insulating film is SiO (Col.10, lines: 30-40).

In reference to claim 76, Zhang teaches wherein the dopant is B (Col.10, lines: 51-68).

In reference to claim 77 Zhang teaches wherein the semiconductor film is polycrystalline Si (Col.1, lines: 30-38).

In reference to claim 78, Zhang teaches wherein B is supplied by diborane gas (Col.10, lines: 51-68).

In reference to claim 81, Zhang teaches further comprising laser irradiation (Col.11, lines: 1-15).

In reference to claim 82, Zhang teaches wherein annealing is heating (Col.11, lines: 33-35).

In reference to claim 83, Zhang teaches wherein the ion doping is performed without mass separation(Col.10, lines: 50-68).

In reference to claim 84, Zhang teaches wherein the ion doping is performed without mass separation(Col.10, lines: 50-68).

In reference to claim 85, Zhang teaches wherein the ion doping is performed without mass separation(Col.10, lines: 50-68).

In reference to claim 86, Zhang teaches wherein the ion doping is performed without mass separation(Col.10, lines: 50-68).

Response to Arguments

Applicant's arguments filed 9/24/02 have been fully considered but they are not persuasive. Applicant argues that Zhang teaches a method of ion doping which includes mass separation and therefore is distinguished from Applicant's claim which recites ion doping without mass separation. This argument is unpersuasive because Zhang does not teach any mass separation, in fact, the Zhang reference makes no mention of mass separation as asserted by the Applicant. Further, Applicant argues that mass separation *will not* occur when a dopant gas is used as the source for ion doping. Applicant is referred to Col.10, lines: 50-68 of Zhang which teaches to use gases as dopant sources and therefore, based on Applicant's own description, would imply that no mass separation occurs.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laura M Schillinger whose telephone number is (703) 308-6425. The examiner can normally be reached on M-T, R-F 7:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl W Whitehead, Jr. can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1500.

LMS
December 29, 2002

Carl Whitehead

CARL WHITEHEAD, JR.
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